REMARKS

Claims 1-26 are now pending in the application. Claims 1, 13, 14, and 26 are now amended. The amendments are fully supported by the application as filed and do not introduce new subject matter. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

CLAIM OBJECTIONS

The Office Action objects to Claims 13 and 26 alleging that Claims 13 and 26 lack antecedent basis for "preliminary discharging (flushing)". Applicant now amends Claims 13 and 26 to recite " a preliminary discharging (flushing) operation." Applicant respectfully requests reconsideration and withdrawal of this objection of Claims 13 and 26.

REJECTION UNDER 35 U.S.C. § 103

Claims 1-7 and 13 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Toye (U.S. Pat. No. 4,068,144) in view of Arakawa et al. (U.S. Pat. No. 6,270,180). Claims 8-12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Toye reference in view of the Arakawa et al. reference and further in view of Speakman (6,503,831). Claims 14-20 and 26 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Toye reference in view of the Arakawa et al. reference. Claims 21-25 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Toye reference in view of the Arakawa et al. reference and further in view of the Speakman reference. These rejections are respectfully traversed.

Independent Claim 1 is now amended to recite, in part, "wherein the piezoelectric element is subjected to a heating drive signal of a repetitive frequency in an ultrasonic band when the aperture is positioned in an image formation region" [W, Figure 1]. Therefore, the discharge liquid can be heated immediately preceding the discharge of the liquid from a discharge head so as to restrain deterioration in the discharging performance attributable to temperature changes in the discharge liquid between the time the liquid is heated and the time that the liquid is actually discharged. See paragraph [0006], for example.

Amended independent Claim 14 recites, in part and with reference to Figure 4 for exemplary purposes only as the invention includes numerous embodiments, "wherein the normal drive signal and the heating drive signal are both generated by a drive signal generating section [8b]." The use of a single drive signal generating section to generate both the normal drive signal and the heating drive signal advantageously reduces the complexity of the system, as opposed to systems where the head drive signal is generated by a circuit that is independent of a heating signal.

The Arakawa et al. reference appears to disclose, with reference to Figure 7, a drive-wave form generating circuit 15 having a heat waveform generating section 151 and a drive-waveform generating section 152. With reference to Figure 6, when the carriage 2 is present inside the image formation area, the drive-waveform generating section 152 is activated to deposit ink within the image formation area. When the carriage 2 is outside the image formation area, the heat-waveform generating section 151 is activated to heat the ink. The heat-waveform generating section and the drive-wave form generating section are independent circuits and switch 153 is used to select

between these two circuits 151 and 152. The Arakawa et al. reference fails to disclose or suggest heating the ink when the carriage is within the image formation area.

The Arakawa et al. reference fails to disclose or suggest "wherein the piezoelectric element is subjected to a heating drive signal of a repetitive frequency and an ultrasonic band when the aperture is positioned in an image formation region," as set forth in amended Claim 1. The Arakawa et al. reference also fails to disclose or suggest "wherein the normal drive signal and the heating drive signal are both generated by a drive signal generation section," as set forth in amended Claim 14.

The Toye reference appears to disclose, with reference to Figure 1, a droplet discharging apparatus. As acknowledged on page 2 of the outstanding Office Action, the Toye reference fails to disclose a piezoelectric element that is subjected to a heating drive signal of a repetitive frequency, as set forth in Claims 1 and 14.

As set forth above, the Arakawa et al. reference and the Toye reference each fail to disclose or suggest each and every feature of both amended Claim 1 and amended Claim 14. Therefore, combination of the Arakawa et al. and the Toye references fails to render obvious either amended Claim 1 or amended Claim 14, as well as those claims dependent therefrom.

Applicant respectfully requests reconsideration and withdrawal of this Section 103 rejection of Claims 1 and 14 and those claims dependent therefrom.

Additional differences between Applicant's invention and the Arakawa et al. reference, the foreign equivalent of which is Japanese Publication No. 11-138798, are discussed at length in Applicant's application under the heading "Description of the Related Art."

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

Dated: June 29, 2005

By: _____
G. Gregory Schivley, Reg. No. 27,382
Bryant E. Wade, Reg. No. 40,344

HARNESS, DICKEY & PIERCE, P.L.C.
P.O. Box 828
Bloomfield Hills, Michigan 48303
(248) 641-1600

GGS/BGS/les